

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 27-36 and 42-51 are in this case. Claims 33 and 48 were withdrawn by the Examiner from consideration as drawn to a non-elected species of the invention. Claims 27-32, 34-36, 42-47 and 49-51 have been rejected under § 102(b) or § 103(a). Independent claims 27 and 42 have now been amended. Dependent claims 29, 36, 44 and 51 have now been canceled.

Amendments Under 37 CFR 1.116

The Applicant submits herewith amendments under 37 CFR 1.116. To the extent that the Examiner finds the arguments presented below persuasive, these amendments will render the claims in condition for allowance. In the event that the Examiner does not find the arguments persuasive, the Applicant believes that the amendments still satisfy the requirements of 37 CFR 1.116 and should be entered, thereby simplifying the issues for the purpose of an appeal.

Specifically, the amendments filed herewith are merely a narrowing of the independent claims by inclusion of features already recited in the dependent claims of record.

The Applicant respectfully submits that these amendments do not raise any new substantive issue, and "requires only a cursory review by the examiner" as per the language of MPEP 714.13 defining amendments which should be entered after Final Rejection.

§ 102(b) Rejections

The Examiner has rejected claims 27, 28, 34, 42, 43 and 49 under § 102(b) as anticipated by Leheny et al. (US 3,761,837). The Examiner's rejections are respectfully traversed.

While continuing to traverse the Examiner's rejections, in order to expedite the prosecution, the Applicant has chosen to amend independent claims 27 and 42 to include the limitations of dependent claims 29 and 36, and dependent claims 44 and 51, respectively. The amendment of the claims renders moot the Examiner's rejections under § 102(b).

§ 103(a) Rejections

The Examiner has rejected claims 29-32, 35-36, 44-47 and 49-51 under 35 U.S.C. 103(a) as being unpatentable over Leheny in view of Yegnanarayanan et al. (US 2003/0142943). The Examiner's rejections are respectfully traversed.

Leheny describes stimulated emission achieved in gallium phosphide crystals which have been doped with Nitrogen or Bismuth. Leheny emphasizes repeatedly throughout the document, in the Title, through the Description and in the Claims, that the dopant must be isoelectronic with atoms in the semiconductor, "*and thus does not act as a donor or an acceptor*" (col. 3, lines 25-26). Leheny further provides a proposed theoretical basis (col. 3, line 60 through col. 4, line 12) as to why specifically isoelectronic dopants are effective to enable stimulated emission. The teachings of Leheny are thus unequivocal that isoelectronic dopants are an essential requirement in order to achieve stimulated emission in an indirect band-gap semiconductor.

Yegnanarayanan et al. teaches a silicon based optical modulator. The Examiner has pointed out that Yegnanarayanan discloses that the optical modulator

may be used with an optical amplifier. However, Yegnanarayanan does not offer any teaching relevant to optical amplification in silicon. Yegnanarayanan discloses doping of silicon with gold or platinum to eliminate minority charge carriers.

The Examiner has asserted that it would be obvious to modify the teachings of Leheny in view of Yegnanarayanan in order to employ silicon doped with gold for optical amplification by stimulated emission. In response, the Applicant respectfully submits that:

- The teachings of Yegnanarayanan et al. with regard to doping of silicon give no indication that the doping serves any purpose in achieving optical amplification. Yegnanarayanan et al. merely illustrates that it is known in other contexts to dope silicon with gold or platinum, a fact which is not disputed by the Applicant.
- With regard to Leheny, as detailed above, Leheny makes it abundantly clear that, in order to achieve stimulated emission in an indirect gap semiconductor, the semiconductor should be doped with a dopant which is isoelectronic with atoms in the semiconductor crystal. As a result, gold, platinum and all the other dopants recited in the amended independent claims would clearly be ruled out by Leheny's explicit teachings as unsuitable for achieving stimulated emission in silicon since none of them is isoelectronic with silicon.

While continuing to traverse the Examiner's rejections, the Applicant has, in order to expedite the prosecution, chosen to amend independent claim 27 in order to clarify and emphasize the crucial distinctions between the device of the present invention and the devices of the Leheny and Yegnanarayanan patents cited by the Examiner. Specifically, independent claim 27 has been amended to include the

limitations of now canceled dependent claims 29 and 36, thereby specifying an implementation with silicon and with dopants which are non-isoelectronic with silicon. A parallel amendment has been made to independent apparatus claim 42 which now includes the limitations of canceled dependent claims 44 and 51.

Amended independent claims 27 and 42 now feature language which makes it absolutely clear that the device and method of the present invention implement generation of optical illumination by population inversion and stimulated emission in silicon doped with a dopant which is non-isoelectronic with silicon. The Applicant believes that the amendment of the claims completely overcomes the Examiner's rejections on § 103(a) grounds.

In view of the above amendments and remarks, the Applicant respectfully submits that the invention as claimed is clearly neither taught nor in any way suggested by the Leheny or Yegnanarayanan references, considered alone or in combination. Reconsideration of the Examiner's rejections under § 103(a), and allowance of the claims, is respectfully and sincerely solicited.

Respectfully submitted,

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